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### Deposited in DRO:

08 August 2014

### Version of attached file:

Published Version

### Peer-review status of attached file:

Peer-reviewed

### Citation for published item:

Cho, I. and Slight, S.P. and Nanji, K.C. and Seger, D.L. and Dykes, P.C. and Bates, D.W. (2013)  
'Understanding responses to a renal dosing decision support system in primary care.', in Medinfo 2013 :  
proceedings of the 14th world congress on medical and health informatics. Amsterdam: IOS Press, p. 931.  
Studies in health technology and informatics. (192).

### Further information on publisher's website:

<http://dx.doi.org/10.3233/978-1-61499-289-9-931>

### Publisher's copyright statement:

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### Additional information:

This book presents the proceedings of the MEDINFO 2013 conference, held in Copenhagen, Denmark, in August 2013. The theme of the conference is "Conducting medical informatics by converging technologies, conveying sciences and connecting people".

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## Understanding Responses to a Renal Dosing Decision Support System in Primary Care

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### Abstract and Objective

Renal dosing clinical decision support (CDS) systems have demonstrated clinical effectiveness and potential benefits for patient outcomes. However, the high override rates consistently reported are problematic and undesirable. To understand providers' use patterns of renal dosing CDS, we investigated the override reasons obtained from primary care practices affiliated with two teaching hospitals. We selected a stratified random sample of 300 alerts and reviewed electronic medical records. Appropriateness criteria and an inter-rater reliability process were used. We found that two thirds of alerts were overridden inappropriately, and this proportion was similar for frequent over-riders as compared to the remainder of physicians. These findings imply that strategies are needed to convince providers to accept more clinically appropriate suggestions, though they need to be broadly targeted.

### Keywords:

Clinical decision support systems, electronic prescribing, renal dosing, primary health care.

### Introduction

Adverse drug events due to dosing errors are common, costly, and often preventable in patients with renal insufficiency. For decades, automated clinical decision support (CDS) has shown promise in reducing medication errors including improvement in the frequency of appropriate dosing.[1] However, previous studies have shown that providers override 50 ~ 80% of alerts generated by renal dosing decision support systems.[2] These high override rates imply that either too many alerts are being delivered, or that providers may be overriding clinically important suggestions, and some providers may be especially likely to override alerts. Either way, there are opportunities for improvement. To better understand this issue, we investigated the appropriateness of rejecting advice delivered by a renal dosing CDS system.

### Methods

We obtained renal dosing override lists and the coded override reasons provided by providers (presented with >20 alerts) at the time of prescribing over a three-year period with IRB approval. We randomly sampled 300 warnings stratified by the prescribing provider's override rate; 200 warnings from the providers categorized in the top quintile and 100 from the remaining providers. We developed explicit criteria around what is considered appropriate in relation to renal dosing overrides.

Researchers scored the overrides as appropriate or inappropriate using data contained in the patients' electronic health record and carried out an inter-rater reliability assessment.

### Results

The overall override frequency was 3,221 (78.2%) of 4,120 alerts. In the chart reviews of the two samples, six and five cases were excluded due to repeated alerts or cancellation of the orders. The drugs triggering alerts were mostly hypoglycemic agents and an antihypertensive, which accounted for 178/194 (91.8%) and 76/95 (80%) respectively. The chart review revealed that appropriate override rates were 71.6% and 73.7% for each sample, and the inappropriateness pattern by samples was very similar (Table 1). No new order was found to be appropriate. As for override reasons, the 'patient has tolerated this drug in the past' was the most frequent reason (68.2%), followed by 'other' (23.9%), then 'new evidence supports therapy of this type' (6.9%), and 'advice from a consultant' (1.0%).

Table 1 Frequency of inappropriate override alerts

Order type	No. of inappropriate override/total alerts (%)	
	Sample from top quintile (N = 194)	Sample from remainder (N = 95)
New	28/28 (100.0)	17/17 (100.0)
Renew/Activate	111/166 (76.9)	53/78 (67.9)
Total	139/194 (71.6)	70/95 (73.7)

### Conclusion

Among over-ridden alerts over a three-year period, almost two of three overrides were inappropriate. Surprisingly, the override rates for high frequency and low frequency over-riders were similar for this area of decision support, suggesting that both groups should be targeted in interventions.

### References

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